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**Senatori**

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(54) **HERMETIC SEAL**

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USPC ..... 361/752, 679.55, 758, 770, 804, 807, 361/810; 156/305; 257/678; 312/223.2; 349/58, 60, 122, 153; 174/564  
See application file for complete search history.

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(57) **ABSTRACT**

Embodiments provide apparatuses and systems associated with a hermetic seal. The hermetic seal may include a bumper that protrudes past a top surface of the bezel to protect a display and a damper that couples to a cover to support the display.

**14 Claims, 3 Drawing Sheets**

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(51) **Int. Cl.**

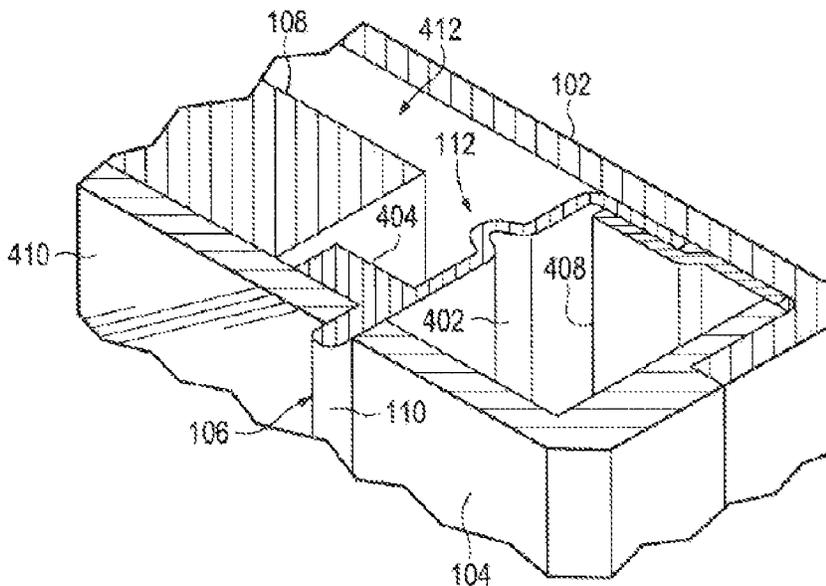
**G02F 1/1333** (2006.01)  
**H05K 5/06** (2006.01)  
**G06F 1/16** (2006.01)  
**H05K 5/00** (2006.01)

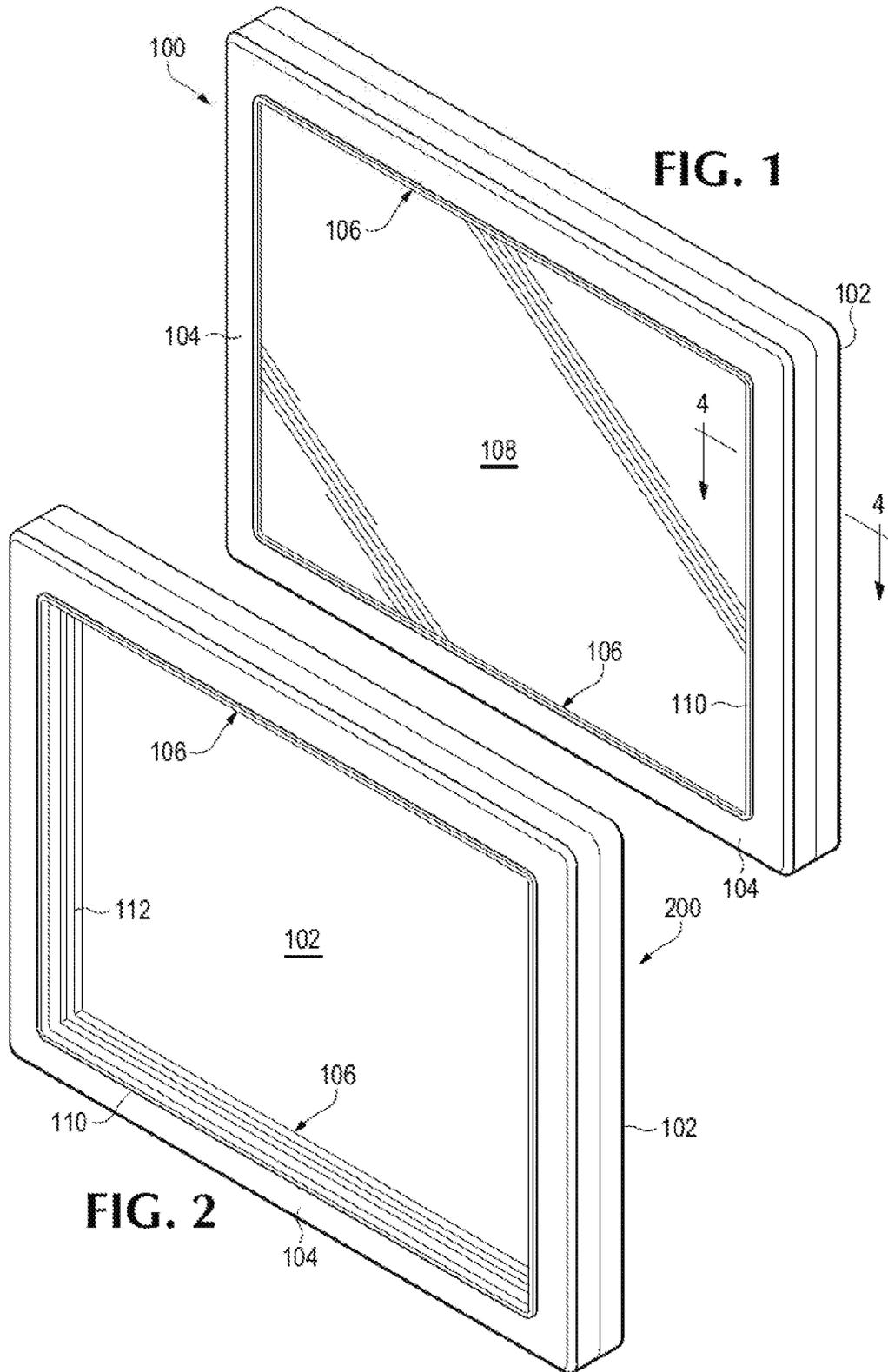
(52) **U.S. Cl.**

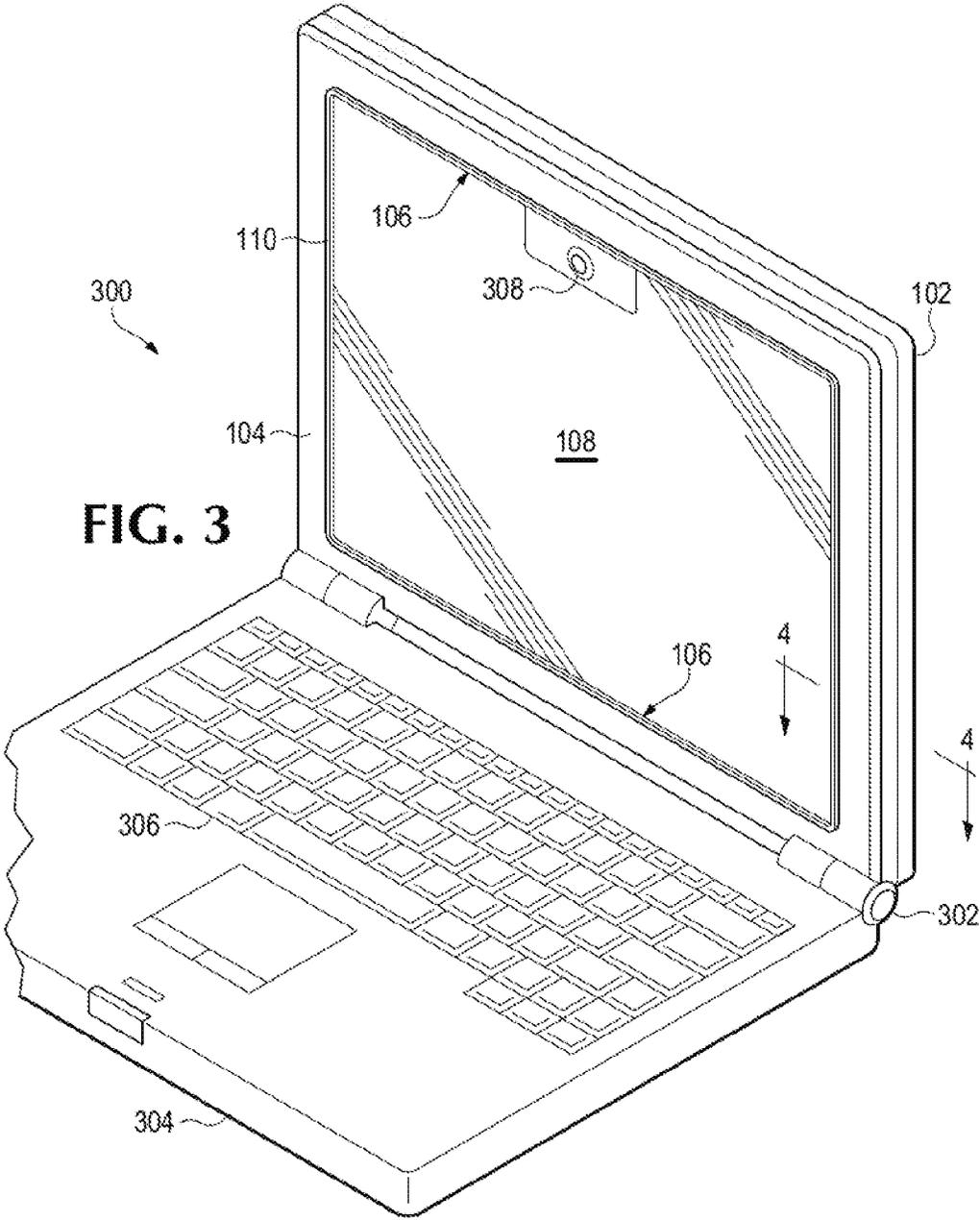
CPC ..... **H05K 5/068** (2013.01); **G06F 1/1656** (2013.01); **H05K 5/0017** (2013.01)

(58) **Field of Classification Search**

CPC ..... G02F 1/133308; G02F 1/1333; G02F 1/1339; G02F 2001/133317; G02F







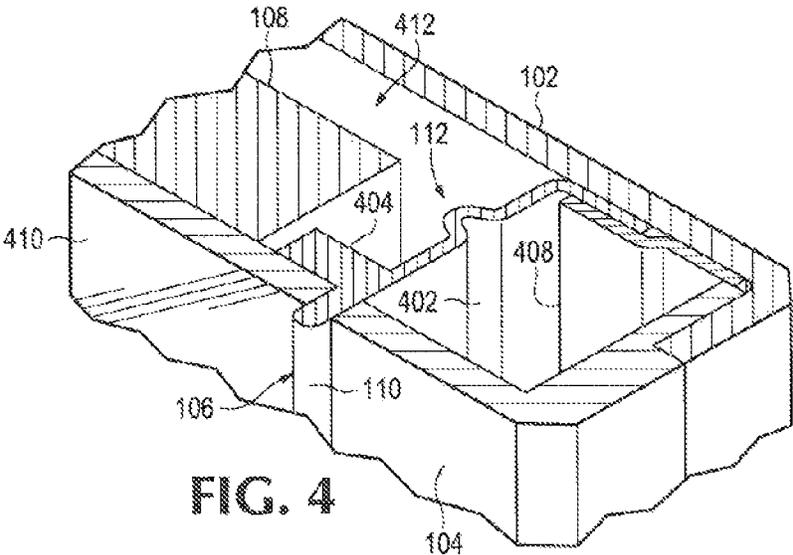


FIG. 4

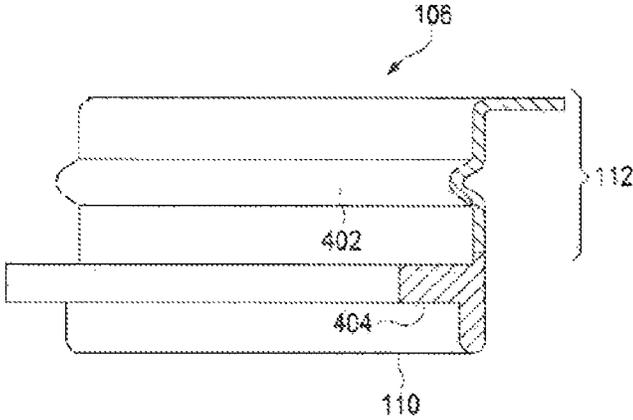


FIG. 5

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## HERMETIC SEAL

### BACKGROUND

Computing devices are ubiquitous in both personal and professional activities. The ever-present nature of these devices may lead to an increase in reliability issues stemming from, for example, transportation, storage, or usage in various environments. To reduce these issues, various computing devices have moved toward more rugged and robust designs.

### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 illustrates a perspective view of a system in accordance with various embodiments;

FIG. 2 illustrates a perspective view of a system in accordance with various embodiments;

FIG. 3 illustrates a perspective view of a system in accordance with various embodiments;

FIG. 4 illustrates a cross sectional view in accordance with various embodiments; and

FIG. 5 illustrates a perspective view of a hermetic seal in accordance with various embodiments.

### DETAILED DESCRIPTION

Computing devices such as, but not limited to, notebook computers, may experience damage through transportation, storage, and use in varying environments. For example, transporting a computing device may lead to vibrations and jostling of various components. As another example, storage and use of the device in various environments may introduce dust, moisture, or other elements that may be detrimental to the computing device and its components.

In the present disclosure, a hermetic seal and its use in a computing system are disclosed. The hermetic seal may function to protect various components of the computing system from unwanted particulates, vibrations, and from contact with other components.

Referring to FIGS. 1 and 2, systems 100 and 200 are illustrated in accordance with various embodiments. The systems comprise a cover 102, a bezel 104 coupled to the cover 102, and a hermetic seal 106. In the embodiment illustrated in FIG. 1, the system 100 additionally includes a display 108.

In various embodiments, the systems 100 and 200 may be a computing system such as, but not limited to, a tablet computer or a slate computer, in other embodiments, the systems 100 and 200 may be part of a larger computing system, such as, but not limited to, a notebook computer, a netbook computer, or a desktop computer. Other systems and uses of the disclosure are contemplated. The cover 102 may be utilized as a back plate for the computing systems 100 or 200, while the bezel 104 is utilized as a front cover that borders the display 108.

In various embodiments, the system 100 may include a display 108. The display 108 may include a liquid crystal display (LCD), light emitting diode (LED) display, an organic light emitting diode (OLED) display, or any other type of display. The display 108 may additionally comprise a top-glass or protective cover. The top-glass or protective cover 108 may be a transparent material having a hardness which provides scratch resistance and durability in computing devices and systems. In various embodiments, the system 100 may be manufactured and produced without the display 108, as seen in FIG. 2. The system 200 may be configured to

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receive a display 108 prior to finalizing the product. Consequently, the system 200 of FIG. 2 may provide a drop in for display 108.

In various embodiments, the hermetic seal 106 is a seal configured to form an air-tight or vacuum seal. Once generated, the hermetic seal 106 may sustain such an airtight environment, thus preventing the entrance of particulates, such as but not limited to dust and water. The hermetic seal 106 may be disposed along a boundary of the bezel 104 and/or the display 108, and be configured to support and protect the display 108. For example the hermetic seal 106 may be disposed along an inner edge of the bezel 104, and therefore, may serve to separate the display 108 from the bezel 104. The hermetic seal 106 may comprise a bumper 110 that protrudes past a top surface of the bezel 104 to protect the display 108. By protruding past the top surface of the bezel 104, the bumper 110 may prevent various objects from contacting the surface of the display 108 and/or the bezel 104. For example, if the system 100 were to be laid down on a counter-top with the display 108 facing down, the bumper 110 may elevate the display 108 and the bezel 104 so that they do not rest on the counter-top, thereby preventing possible damage such as, but not limited to, scratches.

In various embodiments, the hermetic seal 106 also comprises a damper 112 coupled to the cover 102. The damper 112 comprises the portion of the hermetic seal 106 between the display mount and the portion of the hermetic seal 106 that is configured to engage the cover 102. The damper 112 may be configured to support the display 108. Supporting the display 108 may include separating the display 108 from the cover 102, in various embodiments, this separation may enable the display to move in response to vibrations or jolts. For example, the damper 112 may enable the display 108 approximately 2 to 3 millimeters of movement. This movement may lessen the impact of vibrations and jolts on the various components. Additional or wider ranges of movement are contemplated.

In addition to providing support, the damper 112 may also be configured to reduce vibrations and their effects on the electronics contained within the hermetic seal 106. To reduce vibrations and their effects on the electronics contained within the hermetic seal 106, the damper 112 may comprise a shock absorber. The shock absorber may include an undulating surface, a corrugation, or other elements configured to absorb and further dampen vibrations.

Referring now to FIG. 3, another embodiment is illustrated in accordance with the present disclosure. The system 300 may be a notebook or netbook computer. The system 300 may comprise a cover 102, a bezel 104, a hermetic seal 106 having a bumper 110 and a damper (not illustrated), a display 108, a base 304 having a keyboard 306, and a hinge 302 coupling the base 304 to the cover 102.

In addition, the system 300 may also include various other components such as, but not limited to, a camera 308, microphones (not illustrated), and electronics associated with touch displays (not illustrated). These components may be disposed, partially or entirely, within the hermetically sealed area formed by the hermetic seal 106.

In various embodiments, the cover 102, the bezel 104, the hermetic seal 106 having the bumper 110 and damper (not illustrated), and the display 108 may function as described with reference to FIGS. 1 and 2. In the embodiment, the hinge 302 may serve as an axis point, about which, the base 304 and the cover 102 (and associated components) may pivot. For example, in the embodiment, the cover 102 may pivot about hinge 302 to come into contact with base 304 in a clam-shell manner, in the closed position, wherein the display 108 is

brought into close proximity to the keyboard **306**, the bumper **110** of the hermetic seal **106** may contact the base **304** and/or the keyboard **306**. Furthermore, because the bumper **110** protrudes beyond a top surface of the bezel **104**, and consequently the top-glass or protective cover of display **108**, the display **108** is protected from contact with the keyboard **306** and/or base **304**.

The hermetic seal **106** may further comprise a damper. The damper may be configured to support the display **108**. The damper may be coupled to the back side of the cover **102** and provide an air-tight environment for components within the seal, in other words, the environment may comprise an area confined by the cover **102**, the hermetic seal **106**, and the display **108**.

Referring to FIG. **4**, a cross sectional view of the systems of FIGS. **1** and **3** (as indicated in FIGS. **1** and **3**) is illustrated in accordance with various embodiments, in the illustrated embodiment, a hermetic seal **106** having a bumper **110**, a damper **112**, and a display mount **404** is illustrated. Additionally, the embodiment includes a display **406** along with its corresponding top-glass or protective cover **410**, bezel **104**, cover **102**, and a compression flange **408**.

The hermetic seal **106** includes bumper **110**, damper **112** and display mount **404**. The bumper **110** may protrude past a top surface of bezel **104**. Additionally, in the illustrated embodiment, the protective cover **410** of display **108** is coplanar with the bezel **104**. In other words, the top surface of the protective cover **410** is even with the top surface of the bezel **104**. Consequently, the bumper **110** of the hermetic seal **106** protrudes beyond the top surface of the bezel **104** and the display **108**.

The hermetic seal **106** also includes a damper **112**. The damper **112**, in various embodiments, is configured to support the display **108**. To support the display **108**, the damper **112** of the hermetic seal **106** may brace the display **108** against the cover **102**. This may enable the display **108** an amount of separation from the cover **102**. Additionally, the damper **112** of the hermetic seal **112** may include one or more shock absorbers **402**. The shock absorbers **402** may be corrugations, undulating surfaces, or other elements that are configured to absorb shock. The shock absorbers **402** may be configured to dampen vibrations and enable the display **108** to move in response to vibrations or jolts. The movement is further enabled by the separation of the display **108** from the cover **102**.

In addition to the damper **112** and the bumper **110**, the hermetic seal **106** may also include a display mount **404**. The display mount **404** may be configured to couple with either the protective cover **108**, or with the protective cover **410** and the display **108**. In the illustrated embodiment, the display mount **404** is coupled with the protective cover **410**. The protective cover **410** may be coupled to the display mount **404** via an adhesive. The adhesive may be disposed in a manner that maintains the hermetically sealed environment provided, in part, by the hermetic seal **106**.

In the embodiment in which the protective cover **410** and the display **108** are coupled to the display mount **404**, adhesives and mechanical fasteners may be utilized. The adhesives may be disposed in a manner that maintains the hermetically sealed environment provided, in part, by the hermetic seal **106**, and the fasteners may be configured to provide additional support to the display **108**. Fasteners can include screws, clips, or other mechanical components. Adhesives may include glues, sealants, caulking, or other elements configured to seal and adhere.

In various embodiments, a compression flange **408** may be utilized to maintain the hermetically sealed environment

enabled by the hermetic seal **106**. The compression flange **408** may be a variety of materials ranging from plastics to metal. The compression flange **408** is configured to compress the hermetic seal **106** against the cover **102**. The compression flange **408** may be disposed around a perimeter of the hermetic seal **106**. Additionally, as viewed in the illustration, the compression flange **408** may also be compressed against the cover **102** via an internal portion of the bezel **104**.

In various embodiments, with the hermetic seal **106** being coupled along a periphery of the cover **102** (via compression flange **408**) and a periphery of the display **108** (via protective cover **410**), the hermetic seal **106** may delineate a sealed area **412**. The sealed area **412** may house the internal electronics associated with the display **108**, various additional components (e.g., camera, microphone, etc), and transmission wires (not illustrated). The sealed environment **412** may protect the mentioned electronics and components from damage caused by particulates and/or moisture, as examples.

Referring now to FIG. **5**, a perspective view of a hermetic seal **106** is illustrated in accordance with the present disclosure. The hermetic seal **106** may comprise a damper **112** having a shock absorber **402**, a bumper **110**, and a display mount **404**, in various embodiments, the hermetic seal **106** may comprise one or more plastic molded materials. The materials may be configured to maintain an air-tight or hermetic seal around the display **108** and internal components.

In FIG. **5**, the hermetic seal **106** is a co-molded hermetic seal. For example, the bumper **110** of the hermetic seal **106** and the display mount **404** of the hermetic seal **106** may comprise a material having a first hardness, and the damper **112** of the hermetic seal **106** may comprise a material having a second hardness, wherein the first hardness is different than the second hardness.

In various embodiments, the first hardness may be configured to protect the display **108** by separating the display **108** from various objects, e.g., counter-tops, keyboards, or other objects. The first hardness may be configured to compress, but prevent objects, such as a keyboard or base of a notebook, from coming into contact with the display **108**. The first hardness may be consistent with materials including, but not limited to, rubber materials having varying elasticity and plastics.

In various embodiments, the second hardness may be configured to with a specific dampening resistance. For example, the second hardness may be configured to enable the damper **112** and shock, absorber **402**, to absorb shock and vibration. The second hardness may enable the display **108** to move within the sealed area in response to shock and vibration without allowing the display **108** to contact the cover **102**. The second hardness may be consistent with materials including, but not limited to, rubber materials having varying elasticity and plastics.

The hermetic seal **106** may include a damper **112** configured to support a display along a boundary of the display. The boundary of the display may be defined as an outer edge of the display or an outer edge of the protective cover. Consequently, the damper **112** may be disposed in a manner that substantially mirrors the shape of a display. For example, the damper **112** may engage a cover forming a rectangular enclosed area in which a display may be disposed. In various embodiments, the damper **112** may include a shock absorber. The shock absorber may be in the form of a corrugation or an undulating surface. Other shock absorbers are contemplated.

The hermetic seal **106** may include a display mount **404**. The display mount **404** may be configured to engage a display **108**. For example, a first surface of the display mount **404** may be configured to engage and support a protective cover of the

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display **108**, in another embodiment, the display mount **404** may be configured to engage a protective cover of the display **108** on a first side and engage the display **108** on a second side. The first side may engage the protective cover along with an adhesive while the second side may engage the display **108** via one or more mechanical fasteners.

The hermetic seal **106** may include a bumper **110**. The bumper **110** may be configured to protrude past a top surface of the display. By protruding past a top surface of the display, the bumper **110** may provide protection to the display and/or protective cover. A top surface of the display may be defined as the surface utilized to convey images to a user.

Although certain embodiments have been illustrated and described herein, it will be appreciated by those of ordinary skill in the art that a wide variety of alternate and/or equivalent embodiments or Implementations calculated to achieve the same purposes may be substituted for the embodiments shown and described without departing from the scope of this disclosure. Those with skill in the art will readily appreciate that embodiments may be implemented in a wide variety of ways. This application is intended to cover any adaptations or variations of the embodiments discussed herein. Therefore, it is manifestly intended that embodiments be limited only by the claims and the equivalents thereof.

What is claimed is:

1. A system, comprising:  
a cover;  
a bezel coupled to the cover; and  
a hermetic seal disposed along a boundary of the bezel, wherein the hermetic seal includes a bumper that protrudes past a top surface of the bezel and a damper coupled to the cover to support a display.
2. The system of claim 1, further comprising:  
a compression flange coupled to the hermetic seal, wherein the compression flange is configured to compress the hermetic seal against the cover.
3. The system of claim 1, further comprising:  
the display, wherein the display is coupled to the hermetic seal.
4. The system of claim 3, wherein the display comprises a liquid crystal display (LCD).

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5. The system of claim 3, wherein the display comprises a protective cover, wherein the protective cover is co-planar with the bezel.

6. The system of claim 3, wherein the display is coupled to the hermetic seal by an adhesive.

7. The system of claim 3, wherein the hermetic seal is further configured to separate the display from the bezel.

8. The system of claim 1, wherein the bumper of the hermetic seal comprises a first hardness and the damper of the hermetic seal comprises a second hardness, the first hardness being different than the second hardness.

9. The system of claim 1, further comprising:  
a camera coupled to the cover, wherein an electrical connection of the camera is disposed within the hermetic seal.

10. The system of claim 1, further comprising:  
a keyboard; and  
wherein the bumper on the hermetic seal is configured to separate the display from the keyboard.

11. The system of claim 1, wherein the damper comprises a shock absorber configured to absorb vibration.

12. A hermetic seal, comprising:  
a damper configured to support a display and maintain a hermetic seal along a boundary of the display;  
a display mount coupled to the damper, wherein the display mount is configured to engage the display; and  
a bumper coupled to the display mount, wherein the bumper is configured to protrude past a top surface of the display;  
wherein the display mount and the bumper comprise a first hardness; and  
wherein the damper comprises a second hardness that is different than the first hardness.

13. The hermetic seal of claim 12, wherein the display mount is further configured to engage a protective cover coupled to the display.

14. The hermetic seal of claim 12, wherein the damper comprises a shock absorber.

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